

REMARKS/ARGUMENTS

Favorable reconsideration of this application in view of the above amendments, and in light of the following discussion, is respectfully requested.

Claims 1-2 and 4-21 are pending. Claims 1, 4, 5, 15, and 16 are amended. Claim 21 is new. Claim 3 is canceled without prejudice or disclaimer. Support for the amendment of Claims 1 and 15 can be found in original Claim 3 and paragraph [0075] of the published application, for example. Support for the amendment of Claims 4, 5, and 16 is self-evident. Support for new Claim 21 can be found in the published application at paragraph [0077], for example. No new matter is introduced.

In the Office Action, Claims 1-3, 5-7, 11, 12, 15, and 17 were rejected under 35 U.S.C. § 102(b) as anticipated by Reimers (GB 929326A).¹ Claims 4 and 16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Reimers in view of Dick (US 5,527,225). Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as unpatentable over Reimers in view of Fritzer (US 6,786,844). Claims 1, 8-10, 15, and 18-20 were rejected under 35 U.S.C. § 103(a) as unpatentable over Schmid (US 6,669,588) in view of Reimers.

Amended Claim 1 recites to a belt type continuously variable transmission that includes two pulley shafts, a movable sheave on each pulley shaft, and a fixed sheave arranged on each pulley shaft so as to face the moveable sheave. Amended Claim 1 also recites that a motor is provided in a hollow portion of one of the moveable sheaves, and that the hollow portion includes an inner wall surface. Amended Claim 1 further recites that the motor includes an outer rotor which includes an outer peripheral portion disposed radially about the outer rotor. Furthermore, amended Claim 1 recites a moving direction converting

¹ The Applicants note that the Office Action refers to Reimers as Steuer throughout.

mechanism that is disposed *between the outer peripheral portion of the outer rotor and the inner wall surface of the hollow portion of the moveable sheave.*

The Applicants have recognized that the continuously variable transmission of Claim 1 presents several advantages over conventional arrangements. For example, the moving direction converting mechanism as described in Claim 1 provides a large amount of thrust for a relatively small amount of torque.² Accordingly, the motor may be made more compact and hydraulic efficiency may be improved, for example.³

Turning to the applied references, Figure 1 of Reimers illustrates an infinitely variable gear including conical disks (3, 4, 5, and 6), cam tracks (14, 15, 16, and 17), and balls (20) inserted between opposite cam tracks.⁴ Figure 1 of Reimers also illustrates rotary pistons (24 and 25) enclosed in housings (28 and 29) which are mounted on shafts (1 and 2).⁵ Reimers describes that the moveable disks (4 and 6) are provided with sleeves (38 and 39) which extend over the housings (28 and 29) through keys on the sleeves which engage keyways in the housings.⁶ Accordingly, the disks (4 and 6) rotate directly with the housings (28 and 29) via the respective key and keyway.⁷

Reimers describes that a torque applied by the rotary piston (24) causes the moveable disk (4) to rotate via the coupling sleeve (38).⁸ This rotation of the moveable disk (4) causes the ball (20) to climb along the cam tracks (14 and 16), which accordingly causes the moveable disk (4) to shift in the axial direction toward the disk (3).⁹ However, Reimers does not suggest or disclose a moving direction converting mechanism disposed between an outer

² See the published application at paragraph [0075].

³ Id.

⁴ See Reimers at page 4, lines 40-75.

⁵ See Reimers at page 4, lines 85-110.

⁶ See Reimers at page 4, lines 105-115.

⁷ See Reimers at page 5, line 125 - page 5, line 3.

⁸ See Reimers at page 5, lines 4-8.

⁹

peripheral portion of an outer rotor and an inner wall surface of a hollow portion of a moveable sheave.

Reimers describes a ball and cam arrangement that causes the moveable disk to shift in the axial direction. Reimers also describes that the rotary piston and the moveable disk rotate together via a key and keyway configuration. By comparison amended Claim 1 recites a moving direction converting mechanism that is disposed between the radially disposed outer peripheral portion of the outer rotor and an inner wall surface of the moveable sheave. The moving direction converting mechanism recited in amended Claim 1 converts force in a direction of rotation into force in an axial direction. The key and keyway of Reimers is not equivalent to the moving direction converting mechanism recited in amended Claim 1, as a key and keyway merely slide and do not convert rotational force into axial force.

Furthermore, the cam and ball configuration of Reimers is not disposed *between the outer peripheral portion of the outer rotor and the inner wall surface of the moveable sheave*.

Instead, the cam and ball mechanism is disposed axially between the rotary piston and the moveable disk.¹⁰ Accordingly, Reimers does not suggest or disclose all of the features of amended Claim 1.

Dick fails to cure the deficiencies of Reimers. Figure 6 of Dick illustrates an adjusting mechanism (172) of a four-wheel drive system that includes an electric motor.¹¹ The electric motor includes a motor housing (152) and a rotor (156) which includes external threads which mate with sleeve (162).¹² Dick describes that actuation of the motor causes axial movement of the shift collar (162).¹³ However, Dick does not suggest or disclose a

¹⁰ See Figure 1 of Reimers.

¹¹ See Dick at column 8, lines 1-4.

¹² See Dick at column 8, lines 4-18.

¹³ See Dick at column 8, lines 18-21.

moving direction converting mechanism disposed between an outer peripheral portion of an outer rotor and an inner wall surface of a hollow portion of a moveable sheave.

Dick describes an electric motor whose rotation causes axial movement of a shift collar. However the shift collar (162) is surrounded by an interior surface of the rotor (156) and therefore is not disposed between the outer peripheral surface of the outer rotor and an inner wall surface of the moveable sheave. Accordingly, Dick does not suggest or disclose all of the features of amended Claim 1.

Schmid fails to cure the deficiencies of Reimers and Dick. Figure 4 of Schmid illustrates a conical disk transmission which includes pressure chambers (56) and (58) which adjust the conical disks in the axial direction.¹⁴ Therefore, Schmid is silent with respect to a motor disposed in a hollow portion of one of the moveable sheaves. Accordingly, Schmid does not suggest or disclose a moving direction converting mechanism disposed between an outer peripheral portion of an outer rotor of a motor and an inner wall surface of a hollow portion of a moveable sheave. Furthermore, Fritzer was applied for teachings other than the claimed motor, and fails to cure the deficiencies in Reimers, Dick, or Schmid.¹⁵

Accordingly, even the combined teachings of Reimers, Dick, Schmid, and Fritzer fail to disclose or suggest all of the features of amended Claim 1. It is submitted amended Claim 1 and the claims depending therefrom are in condition for allowance.

Amended Claim 15 recites a belt type continuously variable transmission that includes, among other things, a moving direction converting mechanism disposed between an outer peripheral portion of an outer rotor and an inner wall surface of a moveable sheave. As

¹⁴ See Schmid at column 2, lines 52-62.

¹⁵ See the Office Action at page 7, No. 7.

discussed above with respect to amended Claim 1, the cited references do not suggest or disclose this feature.

Accordingly, amended Claim 15 is respectfully submitted to be in condition for allowance. Dependent Claims 16-20 are submitted to be in condition for allowance for at least the same reasons as amended Claim 15. Moreover, dependent Claims 16-20 recite additional features not suggested or disclosed by the cited references.

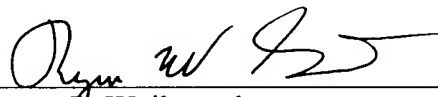
New Claim 21 depends from Claim 1 and is respectfully submitted to be in condition for allowance for at least the same reasons as amended Claim 1. Moreover, new Claim 21 recites an additional feature that is not disclosed or rendered obvious by the cited references.

For the reasons discussed above, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance for Claims 1-2 and 4-21 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

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